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# Stroke

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# Impact of Preexisting Depression on Length of Stay and Discharge Destination Among Patients Hospitalized for Acute Stroke

## Linked Register-Based Study

Jasper Nuyen, MSc; Peter M. Spreeuwenberg, MSc; Peter P. Groenewegen, PhD;  
Geertrudis A.M. van den Bos, PhD; François G. Schellevis, MD, PhD

**Background and Purpose**—There exists limited knowledge regarding the relation between depression and healthcare utilization in stroke patients. The objective of this register-based study was to examine the impact of having preexisting depression at the time of hospital admission for acute stroke on length of hospital stay and discharge destination.

**Methods**—Data from a general-practice database were linked to those of a hospital database to identify patients hospitalized for stroke and were used to categorize these patients into 3 groups based on preexisting mental health (MH) status at admission, ie, those with preexisting depression, those with another preexisting MH condition, and those without any preexisting MH condition. Multilevel analyses controlling for several potentially important covariates were performed to estimate the associations under study.

**Results**—Both patients with preexisting depression (n=41) and those with another preexisting MH condition (n=62) did not differ significantly from patients without any preexisting MH condition (n=211) regarding length of hospital stay for acute stroke. Among patients who survived hospitalization, those with preexisting depression had significantly higher odds of being discharged to an institution instead of their home than did patients without any preexisting MH condition. Having another preexisting MH condition had no significant effect on discharge destination.

**Conclusions**—Having preexisting depression at admission seems to be a relevant factor in determining discharge to institutional care after acute stroke hospitalization. Further research is needed to determine the mechanism(s) through which preexisting depression decreases the chances of being discharged to home. (*Stroke*. 2008;39:132-138.)

**Key Words:** discharge destination ■ length of stay ■ preexisting depression ■ stroke

Poststroke depression (PSD) is common, occurring in about one third of all stroke survivors at some time after stroke onset,<sup>1</sup> and has been associated with slower recovery,<sup>2</sup> cognitive dysfunction,<sup>3</sup> and lower quality of life.<sup>4</sup> Given these poorer outcomes, one might expect that stroke survivors who develop depression have higher healthcare utilization than their nondepressed counterparts. However, limited information is available on this issue. Most studies have examined the impact of PSD on length of stay (LOS) in a rehabilitation setting, and their findings are equivocal. Some studies found an association between PSD and increased LOS (eg, Schubert et al<sup>5</sup>), whereas other studies did not demonstrate such a relation (eg, Gillen et al<sup>6</sup>). Recently, PSD among veterans has been found to be associated with more outpatient visits and an increase in the total length of rehospitalization in the 1-year<sup>7</sup> as well as the 3-year<sup>8</sup> period after initial stroke hospitalization.

Whereas the relation of PSD with healthcare utilization has received some attention, no study to date has examined, to our knowledge, whether there exists a link between preexisting depression at the time of stroke and higher use of healthcare services. Such a link may be expected, because, considering the high prevalence of depression in the elderly general population,<sup>9</sup> a substantial number of patients are likely to experience or have a recent history of depression at the time of stroke and that, in general, depression in older persons is associated with adverse health outcomes and increased healthcare utilization.<sup>10</sup>

The objective of this register-based study was to extend the knowledge regarding the relation between depression among stroke patients and healthcare use by focusing on the impact of having preexisting depression at hospital admission for first-ever or recurrent stroke on LOS and discharge destination (DD). Given that significant depressive symptomatology

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From the NIVEL (J.N., P.M.S., P.P.G., F.G.S.), Netherlands Institute for Health Services Research, Utrecht; the Trimbos Institute (J.N.), Netherlands Institute of Mental Health and Addiction, Utrecht; the Academic Medical Center (G.A.M.v.d.B.), University of Amsterdam, Amsterdam; and the Institute for Research in Extramural Medicine (EMGO) (F.G.S.), VU University Medical Center, VU University Amsterdam, Amsterdam, the Netherlands.

Correspondence to Jasper Nuyen, Trimbos Institute, Netherlands Institute of Mental Health and Addiction, Da Costakade 45, PO Box 725, 3500 AS Utrecht, The Netherlands. E-mail jnuijen@trimbos.nl

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at admission has been associated with increased healthcare utilization at follow-up in the general population of older hospitalized patients,<sup>11</sup> it was hypothesized that having preexisting depression would prolong the LOS for patients admitted for stroke and would increase the likelihood of their being discharged to an institution (ie, nursing home or rehabilitation center) instead of their home among those who survived acute care hospitalization.

## Subjects and Methods

### Data Sources

For this study, data from a general-practice database, ie, the National Network of General Practice (LINH),<sup>12</sup> were linked to data from a hospital database, ie, the National Medical Register (LMR).<sup>13</sup> Information from the LINH database was used to identify patients' preexisting mental health (MH) status at hospital admission for stroke as well as to assess potential confounding variables (see following section). LMR data were used to identify patients who were hospitalized for stroke and to measure LOS and DD (see following section).

The LINH database holds longitudinal data extracted from electronic medical records of general practitioners (GPs) on all patient contacts, including diagnoses and drug prescriptions. Data from a subset of 74 practices were used because these practices provided additional information on morbidity, ie, diagnoses recorded by GPs on so-called "problem lists" of relevant health problems of patients, including those developed in the past. These additional data were collected within the framework of the second Dutch National Survey of General Practice.<sup>14</sup> Diagnoses were coded by GPs according to the International Classification of Primary Care (ICPC),<sup>15</sup> based on the criteria of the International Classification of Health Problems in Primary Care.<sup>16</sup> Prescribed drugs were coded according to the Anatomical Therapeutic Chemical classification system.<sup>17</sup> Furthermore, the indication (ie, ICPC-coded diagnosis) for a prescription was recorded.

The longitudinal LMR database has almost complete coverage (99%) of all hospital admissions in the Netherlands. Recorded data include date of admission, date of discharge, diagnosis at discharge, and DD. Diagnosis at discharge is considered the reason for hospital admission and is coded according to the International Classification of Diseases, Ninth Revision, Clinical Modification.

Patient records from the LINH database were linked to those from the LMR database by using 3 patient identifiers that were present in both databases, ie, sex, date of birth, and 4-digit postal code. A pilot study has shown the feasibility of this linkage procedure.<sup>18</sup>

### Study Population

First, persons 50 years of age or older registered with the 74 general practices on January 1, 2001 were selected (n=68 152). Because almost all noninstitutionalized Dutch inhabitants are registered with a GP, this can be regarded as a general population sample of individuals 50 years or older. Persons were excluded when they had a missing value on any of the 3 linkage variables or a nonunique combination of these variables (n=2190). Next, records of the remaining 65 962 persons from the LINH database were linked to those from the LMR database to identify those who were admitted to hospital for stroke between January 1, 2001 and December 31, 2003. Stroke comprised hemorrhagic stroke (International Classification of Diseases, Ninth Revision, Clinical Modification code 430 or 431), acute ischemic stroke (code 434 or 436), and transient ischemic attack (TIA; code 435). The linkage procedure resulted in the identification of 847 patients who were hospitalized for stroke, corresponding approximately to an admission rate of 4 per 1000 persons age 50 years or older per year. This rate compares well to the expected yearly hospital admission rate for stroke in the general Dutch population age 50 years and older.<sup>19,20</sup>

Of the 847 identified patients, 236 were excluded because general practice data were not available throughout the 6 months preceding

hospital admission (either because a practice ended participating in the LINH or because a patient was no longer registered with the practice). Additionally, 8 patients diagnosed with dementia (ICPC code P70) were excluded to minimize the influence of having dementia on the associations under study. These exclusions left 603 patients for study.

### Dependent Variables

LOS was calculated by subtracting the date of admission from the date of discharge and was expressed in days. DD was treated as a dichotomous variable: discharge to an institutional setting (ie, rehabilitation center or nursing home) versus discharge to home (including homes for the elderly, ie, homes specially designed for the elderly and their needs<sup>21</sup>).

### Independent Variables

The 603 patients were divided into 3 nonoverlapping groups by preexisting MH status at admission: (1) those with preexisting depression, (1) those with a preexisting MH condition other than depression, and (3) a reference group without any preexisting MH condition. The heterogeneous group of patients with another preexisting MH condition was formed to ensure that the reference group consisted of patients who had no preexisting MH problems.

Preexisting depression was defined as having been diagnosed at least once with depression (ICPC code P76) or depressive feelings (code P03) and/or having received at least 1 prescription for any antidepressant (Anatomical Therapeutic Chemical code N06A) in the 6 months preceding admission. The ICHPPC-2-defined criteria for depression correspond largely to those of the DSM-IV for major depression.<sup>22</sup> The P03 code is used for patients with depressive feelings who do not fulfil the criteria for depression.

Patients were considered to have another preexisting MH condition when they had been diagnosed at least once with an MH condition other than depression (ie, a "P" diagnosis other than P76 or P03) and/or had been prescribed at least once an antidepressant for an MH condition other than depression or another psychotropic medication (ie, Anatomical Therapeutic Chemical codes N05, N06B, N06C, or N07B) in the 6 months preceding admission. The remaining patients were defined as having no preexisting MH condition. Patients identified as having both preexisting depression and another MH condition were classified into the group of patients with preexisting depression.

Applying these definitions resulted in the identification of 41 (6.8%) patients with preexisting depression, 132 (21.9%) patients with another preexisting MH condition, and 430 (71.3%) patients without any preexisting MH condition. The 41 patients with preexisting depression were registered with 26 general practices.

### Covariates

Other variables were taken into account that could potentially influence the relation of preexisting depression with LOS and DD, including age, sex, education, living situation before stroke (alone or living with others), year of hospitalization, stroke type, history of prior stroke or TIA, presence of other stroke risk factors, and somatic comorbidity.<sup>23–25</sup> Educational level was categorized into low (no education or elementary school), middle/high (high school, college, or university), and missing. This last category was created because attained educational level was unknown for a substantial number of patients (17%). History of prior stroke or TIA at admission was defined as having been diagnosed with stroke or TIA (ICPC code K90 or K89) in the 6 months preceding admission. The presence of other stroke risk factors (hypertension, code K86 or K87; diabetes mellitus, code T90; atrial fibrillation, code K78; and any cardiovascular condition, code K74 to K77, or K92) and other somatic conditions was established in a similar fashion. Somatic comorbidity was operationalized as a count of the number of somatic conditions<sup>26</sup> other than the stroke risk factors examined (0, 1, 2, and  $\geq 3$  conditions). Year of hospitalization was included to allow for the potential influence of changes in the organization of hospital care of stroke patients during the study period.

**Table 1. Characteristics at Admission, LOS, and DD of Hospitalized Stroke Patients Grouped by Preexisting MH Status**

	Preexisting Depression (n=41)	Preexisting Other MH Condition (n=62)	No Preexisting MH Condition (n=211)	P
Age, y: mean (SD), range	71.1 (10.1), 51.6–89.5	74.1 (8.2), 52.8–87.1	72.9 (9.3), 51.3–92.5	0.28*
50–59	7 (17.1)	4 (6.5)	23 (10.9)	0.56†
60–69	12 (29.3)	15 (24.2)	50 (23.7)	
70–79	13 (31.7)	26 (41.9)	92 (43.6)	
≥80	9 (22.0)	17 (23.6)	46 (21.8)	
Female sex	25 (61.0)	41 (66.1)	103 (48.8)	0.034†
Educational level				
Low	12 (29.3)	33 (53.2)	91 (43.1)	0.11†
Middle/high	21 (51.2)	23 (37.1)	80 (37.9)	
Unknown	8 (19.5)	6 (9.7)	40 (19.0)	
Living alone	10 (24.4)	15 (24.2)	46 (21.8)	0.89†
Year of hospitalization				
2001	7 (17.1)	16 (25.8)	31 (14.7)	0.15†
2002	17 (41.5)	18 (29.0)	95 (45.0)	
2003	17 (41.5)	28 (45.2)	85 (40.3)	
Stroke type				
Acute ischemic stroke	27 (65.9)	39 (62.9)	145 (68.7)	0.13†
Hemorrhagic stroke	4 (9.8)	16 (25.8)	37 (17.5)	
TIA	10 (24.4)	7 (11.3)	29 (13.7)	
History of prior stroke/TIA	8 (19.5)	15 (24.2)	22 (10.4)	0.015†
Hypertension	15 (36.6)	27 (43.5)	80 (37.9)	0.69†
Diabetes mellitus	5 (12.2)	20 (32.3)	42 (19.9)	0.035†
Atrial fibrillation	3 (7.3)	7 (11.3)	15 (7.1)	...‡
Cardiovascular disease	7 (17.1)	11 (20.4)	36 (17.1)	0.99†
Somatic diseases				
0	16 (39.0)	21 (33.9)	82 (38.9)	0.39†
1	12 (29.3)	15 (24.2)	73 (34.6)	
2	7 (17.1)	13 (21.0)	25 (11.8)	
≥3	6 (14.6)	13 (21.0)	31 (14.7)	
DD (including death)				
Home	21 (51.2)	30 (48.4)	132 (62.6)	0.45†
Institution	12 (29.3)	14 (22.6)	43 (20.4)	
Death	8 (19.5)	18 (29.0)	36 (17.1)	
LOS, d: median, interquartile range	13.0, 5.5–23.5	10.5, 5.8–20.5	10.0, 6.0–22.0	0.92§

Data presented are n (%) unless stated otherwise.

\*By ANOVA.

†By  $\chi^2$  test.‡Requirements for  $\chi^2$  test were not met.

§Kruskal-Wallis test.

Furthermore, both death during hospitalization and DD have consistently been shown to significantly influence LOS.<sup>23,27</sup> In general, the period of hospitalization is shortest for patients who die in hospital, intermediate for patients discharged to home, and longest for patients discharged to an institution. Therefore, death during hospitalization and DD were included as covariates in the analysis concerning LOS. Finally, because severity of stroke has been found to be an important factor influencing LOS,<sup>24,25</sup> LOS was included as a proxy for stroke severity in the analysis concerning DD.

### Statistical Analysis

Two steps were taken to reduce the potential confounding influence of variation between practices on the associations under study: (1)

Analyses included only patients with a preexisting MH condition other than depression (n=62) and those without any preexisting MH condition (n=211) who were registered with the 26 practices with whom the 41 patients with preexisting depression were registered, and (2) multilevel modeling was used to strengthen statistical control for potential variation among these 26 practices. Hospitals could not be included as higher-level units because hospital identifiers are not disclosed for analyses by third parties. Allowing for variation at the practice level was considered an adequate proxy for taking into account variation at the hospital level (eg, variation in care for stroke patients, availability of a stroke unit, and discharge planning), based on the assumption that most stroke patients who were registered with the same practice were admitted to the same hospital.



The distribution of LOS was skewed. However, logarithmic transformation resulted in an approximately normal distribution. A 2-level, random-intercept, linear-regression model was used to analyze the influence of having preexisting depression on the logarithmically transformed LOS. A 2-level, random-intercept, logistic-regression model was used to assess the relation between having preexisting depression and discharge to an institution among the stroke patients who survived hospitalization. The reference category was being discharged to home. Multilevel analyses were performed with MLwiN, version 2.0, and statistical significance was tested with the Wald statistic ( $P < 0.05$ ).

## Results

### Patients With Preexisting Depression and Their General Practices

The majority of the 41 patients with preexisting depression (80.5%) were diagnosed at least once with depression ( $n = 31$ ) or depressive feelings ( $n = 2$ ) in the 6 months preceding hospital admission. The 8 remaining patients defined as having preexisting depression had been prescribed at least once an antidepressant in this period. The vast majority of the 41 patients (90.2%) were prescribed antidepressant drug therapy, most frequently selective serotonin reuptake inhibitors (59.5%). The studied 26 practices were widely geographically distributed. However, with regard to the urbanization level of practice location, practices located in rural areas were relatively overrepresented.

### Length of Acute Hospital Stay

Table 1 presents baseline characteristics as well as LOS and DD (including death during hospitalization) for the 3 groups classified by preexisting MH status. The 3 groups did not differ significantly with regard to LOS in bivariate analysis. The distribution of sex, history of prior stroke/TIA, and diabetes mellitus differed overall significantly among the groups. Post hoc tests showed that relative to patients without a preexisting MH condition, a higher number of patients with another preexisting MH condition were female ( $P = 0.020$ ), had a history of prior stroke/TIA ( $P = 0.010$ ), and had diabetes mellitus ( $P = 0.057$ ). Also, more patients with another preexisting MH condition than those with preexisting depression had diabetes mellitus ( $P = 0.033$ ).

The results of the 2-level regression analysis for logarithmically transformed LOS are shown in Table 2. Compared with having no preexisting MH condition at admission, neither having preexisting depression nor having another preexisting MH condition significantly influenced duration of hospitalization, after controlling for the measured covariates as well as interpractice variation. As expected, being admitted to a hospital because of a TIA (compared with being admitted because of an ischemic stroke) and dying during hospitalization (compared with being discharged to home) were associated with a shorter LOS, whereas being sent to an institution (compared with being discharged to home) was related to prolonged LOS. Furthermore, patients age 70 years or older at admission were more likely to stay longer in the hospital than patients between 50 and 59 years.

### Discharge Destination

Sixty-two (19.7%) of the stroke patients died in hospital (see Table 1). Two-level, logistic-regression analysis showed that

**Table 2. Two-Level Linear-Regression Model for Logarithmically Transformed LOS Among Hospitalized Stroke Patients ( $n = 314$ )**

	B	95% CI	P
Preexisting MH status			
No preexisting MH condition	Reference		
Preexisting depression	0.149	−0.12 to 0.42	0.27
Preexisting other MH condition	0.103	−0.13 to −0.33	0.38
DD (including death)			
Home	Reference		
Institution	0.847	0.62 to 1.08	<0.001
Death	−0.923	−1.18 to −0.67	<0.001
Stroke type			
Acute ischemic stroke	Reference		
Hemorrhagic stroke	−0.067	−0.33 to 0.19	0.62
TIA	−0.726	−0.99 to −0.47	<0.001
History of prior stroke/TIA	0.068	0.19 to 0.32	0.60
Hypertension	0.145	−0.034 to 0.33	0.11
Diabetes mellitus	−0.049	−0.27 to 0.17	0.66
Atrial fibrillation	−0.053	−0.39 to 0.28	0.76
Cardiovascular disease	0.005	−0.23 to 0.24	0.97
Somatic diseases			
0	Reference		
1	−0.028	−0.24 to 0.18	0.79
2	−0.118	−0.40 to 0.17	0.42
≥3	−0.119	−0.39 to 0.15	0.39
Age groups			
50–59	Reference		
60–69	0.153	−0.18 to 0.48	0.36
70–79	0.389	0.075 to 0.70	0.015
≥80	0.501	0.15 to 0.85	0.0055
Female sex	−0.142	−0.33 to 0.050	0.15
Educational level			
Low	Reference		
Middle/high	−0.186	−0.39 to 0.017	0.072
Unknown	−0.105	−0.35 to 0.14	0.41
Living with others	−0.090	0.31 to 0.13	0.42
Year of hospitalization			
2001	Reference		
2002	−0.075	−0.33 to 0.18	0.56
2003	−0.100	−0.35 to 0.15	0.43

neither having preexisting depression nor having another preexisting MH condition significantly influenced the risk of dying (data not shown). Two hundred fifty-two patients survived acute hospitalization for stroke. Bivariate analysis showed that the proportion of patients discharged to institutional care did not differ significantly by preexisting MH status (preexisting depression, 36.4%; preexisting other MH condition, 31.8%; no preexisting MH condition, 24.6%;  $P = 0.29$ ). Further bivariate analyses revealed similar between-group differences when the total study sample was

**Table 3. Two-Level Logistic-Regression Model for Discharge to Institution (vs Discharge to Home) Among Stroke Patients Who Survived Initial Hospitalization (n=252)**

	OR	95% CI	P
Preexisting MH status			
No preexisting MH condition	Reference		
Preexisting depression	4.86	1.69–14.02	0.0034
Preexisting other MH condition	1.61	0.53–4.89	0.40
LOS	1.12	1.08–1.15	<0.0001
Stroke type			
Acute ischemic stroke	Reference		
Hemorrhagic stroke	1.08	0.35–3.32	0.89
TIA	0.063	0.010–0.41	<0.005
History of prior stroke/TIA	0.69	0.24–2.02	0.50
Hypertension	0.58	0.28–1.22	0.15
Diabetes mellitus	2.02	0.83–4.90	0.12
Atrial fibrillation	0.27	0.048–1.52	0.14
Cardiovascular disease	2.57	1.00–6.64	0.051
Somatic diseases			
0	Reference		
1	0.43	0.18–1.03	0.060
2	0.88	0.27–2.82	0.82
≥3	0.98	0.31–3.07	0.98
Age groups			
50–59	Reference		
60–69	2.74	0.61–12.30	0.18
70–79	2.41	0.55–10.49	0.24
≥80	6.19	1.34–28.62	<0.05
Female sex	0.85	0.40–1.77	0.66
Educational level			
Low	Reference		
Middle/high	0.89	0.39–2.03	0.79
Unknown	0.67	0.23–1.95	0.46
Living with others	1.14	0.45–2.93	0.78
Year of hospitalization			
2001	Reference		
2002	1.12	0.40–3.13	0.83
2003	1.48	0.55–3.93	0.44

OR indicates odds ratio.

examined (see previous section), with the exception that the difference in sex distribution was no longer significant.

Table 3 shows the results of the 2-level, logistic-regression analysis for DD. Patients with preexisting depression had a significantly higher odds of being discharged to an institution than patients without any preexisting MH condition, after adjusting for the measured covariates and variation between practices. Having another preexisting MH condition did not exert a significant effect. Patients with a cardiovascular condition were significantly more likely to be sent to an institution compared with those without cardiovascular disease. Unsurprisingly, having been admitted to the hospital because of TIA was associ-

ated with decreased odds of being discharged to institutional care, whereas an increased LOS was related to higher odds of discharge to an institution. Finally, patients 80 years or older were more likely to be sent to institutional care than patients between 50 and 59 years.

## Discussion

The present register-based study indicated that having preexisting depression at the time of hospital admission for new or recurrent stroke did not influence LOS. However, among patients who survived hospitalization for acute stroke, we found that patients who were already depressed at admission were more likely to be discharged to an institution instead of their home than those without any preexisting MH condition, after controlling for the influence of several potentially confounding factors, including sociodemographic variables, living alone or not, stroke type, history of prior stroke or TIA, and somatic comorbidity. This is an important finding because it indicates that having preexisting depression may be a relevant factor in determining discharge to institutional care rather than to home after acute stroke hospitalization. As far as we are aware, no previous studies have examined the impact of preexisting MH status at hospital admission for stroke on the use of healthcare services.

Some potential limitations of our study should be acknowledged. First, the generalizability of our findings to the general population of patients hospitalized for stroke may be limited owing to the exclusion of 28% of eligible patients. However, these patients did not differ from those who were included with regard to sex, age, and educational level. Moreover, it is highly unlikely that the reason for excluding these patients, namely, unavailability of general practice medical records, would have been associated with having preexisting depression at admission. Another feature that may have limited the generalizability is that the final study population, and especially the group of patients with preexisting depression, was rather small. Nevertheless, the studied patients were registered with 26 different practices that were geographically located throughout the Netherlands, although practices located in rural areas were somewhat overrepresented. Second, using medical records of GPs to identify patients who were depressed at the time of admission for stroke has some drawbacks. Research has shown substantial underdiagnosis of depression in the Dutch general practice.<sup>28</sup> In comparison, the rate of overdiagnosis seems to be considerably lower.<sup>29</sup> Importantly however, misclassification of cases due to overdiagnosis or underdiagnosis of depression would most likely have attenuated a true relation between preexisting depression and a higher likelihood of being discharged to institutional care after stroke hospitalization rather than to have produced a spurious result. In addition, by using GP records, no standardized assessment of severity of depression was available, nor was information concerning possible initiated psychological treatments for depression. A third limitation is that the influence of potentially important unmeasured factors could not be taken into account. Our study lacks a detailed assessment of stroke severity, which

is an important factor in determining both LOS and DD,<sup>23,25</sup> although LOS was included as a proxy for stroke severity in the analysis concerning DD. Other unmeasured factors, including subtype of ischemic stroke, functional status, cognitive functioning, and availability of social support, may have had modifying or confounding effects on the associations under study. In particular, poorer social support networks and functional and cognitive impairments are linked to depression in the elderly, probably in a complex and reciprocal manner,<sup>10</sup> and each of these factors has been found to reduce the chances of discharge to home after acute stroke hospitalization.<sup>23,30,31</sup>

With these limitations in mind, an obvious question that arises is how the observed association between having preexisting depression at hospital admission for stroke and increased likelihood of institutionalization can be explained. Possibly this finding reflects a heightened level of dependency at discharge among patients with preexisting depression. Their depressive symptoms, such as having pessimistic expectations, being unmotivated, and having less energy and diminished concentration, could reduce their ability to adapt to the impairments caused by stroke and thereby lead to slowed recovery during hospitalization.<sup>32</sup> The possibility of a relation between antecedent depression and increased stroke severity could offer another explanation. The emerging body of evidence that suggests a role for depressive symptoms in the development of stroke does leave open the possibility of such a relation.<sup>33</sup> Finally, having preexisting depression at admission may contribute to a higher level of dependency at discharge through its potential associations with unmeasured factors, such as functional disability, cognitive dysfunction, and poor social support.

Evidently, further studies are needed to confirm our results and to better understand the mechanism(s) through which having preexisting depression increases the likelihood of discharge to institutional care among patients hospitalized for acute stroke. Identification of the underlying mechanism(s) is essential to determine whether there exist opportunities to improve outcomes for stroke patients with preexisting depression and to reduce their frequency of discharge to an institution. Possible targets for intervention may include routine assessment of preexisting levels of depression at hospital admission for acute stroke and optimization of depression management during hospitalization for stroke when necessary. GPs regularly miss depression in older persons, and when they do, often provide inadequate treatment.<sup>10</sup> A further potential intervention strategy might be to intensify the level of care and support provided in the home situation for stroke patients with preexisting depression, eg, by supporting informal caregivers and/or increasing the degree of home health care. Our study complements findings of 2 prior studies of administrative databases that indicated a relation between PSD and long-term healthcare utilization after acute hospitalization.<sup>1,2</sup> Altogether, these findings indicate the need for further studies specifically designed to disentangle the relations between a past history of depression, preexisting depression at the time of stroke, PSD, and acute as well as long-term healthcare utilization.

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## Disclosures

None.

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